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IS 7552 (2003): Industrial Trucks Operating in Special Conditions of Stacking with Mast Tilted Foreward - Additional Stability Tests [TED 22: Transport Tractors and Trailers]

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औद्योगिक ट्रक — अतिरिक्त स्थिरता परीक्षण

( पहला पुनरीक्षण )

*Indian Standard*

INDUSTRIAL TRUCKS OPERATING IN  
SPECIAL CONDITION OF STACKING WITH  
MAST TILTED FORWARD — ADDITIONAL  
STABILITY TEST

( *First Revision* )

ICS 53.060

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BUREAU OF INDIAN STANDARDS  
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NEW DELHI 110002

## FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Industrial Trucks Sectional Committee had been approved by the Transport Engineering Division Council.

Stability tests for industrial trucks are essential to determine the capability of the truck to remain stable under adverse operating situations/conditions involving safety of the operator and the machinery.

IS 4357 : 1974 'Methods for stability testing of forklift trucks (*first revision*)', IS 7309 : 1993 'Reach and straddle forklift trucks — Methods of stability test (*first revision*)' and IS 7631 : 1993 'Pallet stackers and high lift platform trucks — Method of stability test (*first revision*)' set forth stability tests for trucks operating under normal conditions, namely:

- a) Travelling on level surfaces with the load in a lowered position,
- b) Stacking with mast substantially vertical, and
- c) Operating with the centre of gravity of the load on the longitudinal axis of symmetry of the truck.

This standard sets forth additional stability tests for the trucks required to operate under conditions other than the above. This standard was first published in 1974. Its first revision has been undertaken to modify the stability tests requirements with increased rated capacity of the trucks. In order to facilitate international co-ordination on the subject, the standard has been aligned with ISO 5767 : 1992 'Industrial trucks operating in special condition of stacking with mast tilted forward — Additional stability test' issued by the International Organization for Standardization.

The composition of the Committee responsible for formulation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

## Indian Standard

# INDUSTRIAL TRUCKS OPERATING IN SPECIAL CONDITION OF STACKING WITH MAST TILTED FORWARD — ADDITIONAL STABILITY TEST

*(First Revision)*

## 1 SCOPE

This standard specifies the additional stability tests to verify the stability of trucks stacking from level ground with mast tilted forward and the load in the elevated position (see Fig. 1).

**1.1** This standard applies to the following types of trucks and is in addition to the stability tests applicable to each type of trucks under normal operating condition :

- a) Counterbalanced forklift trucks with tilttable masts at all rated capacities;
- b) Reach (retractable mast or forks) and straddle forklift trucks with tilttable masts, up to and including 10 000 kg rated capacity; and
- c) Pallet stackers and high-lift platform trucks, with tilttable masts, up to and including 10 000 kg rated capacity.

**1.2** This standard does not apply to trucks when handling suspended loads which may swing freely.

## 2 REFERENCES

The following standards contain provisions, which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	Title
4357 : 1974	Methods for stability testing of forklift trucks ( <i>first revision</i> )
4660 : 1993	Powered industrial trucks — Terminology ( <i>third revision</i> )

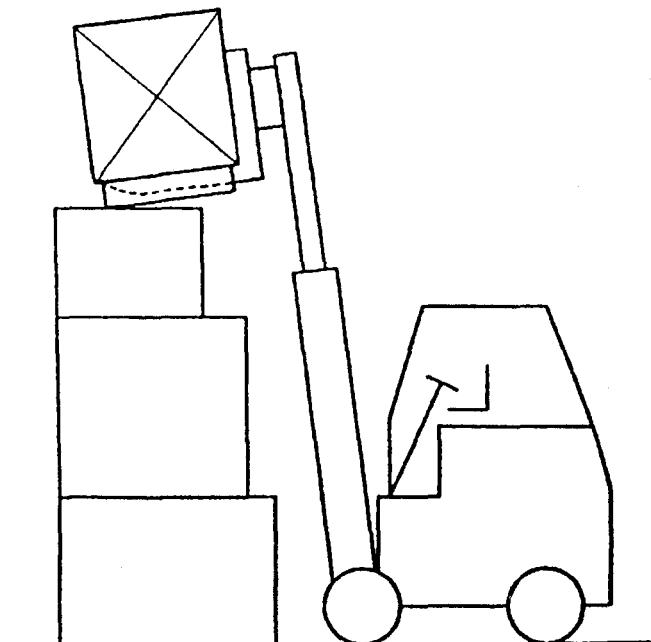


FIG. 1 STACKING AT ELEVATED POSITION

IS No.	Title
6305 (Part 2) : 1980	Safety code for powered industrial trucks: Part 2 Manufacture ( <i>first revision</i> )
7309 : 1993	Reach and straddle forklift trucks — Method of stability test ( <i>first revision</i> )
7631 : 1993	Pallet stackers and high lift platform trucks — Method of stability tests ( <i>first revision</i> )

### 3 TERMINOLOGY

For the purpose of this standard, the terms and definitions given in IS 4660 shall apply.

### 4 CONDITIONS OF VALIDITY

The tests covered in this standard ensure that the truck type under consideration has satisfactory stability under special conditions as mentioned in 1. The tests set forth in the following clauses are in addition to the normal stability tests applicable to the respective types of trucks.

### 5 STABILITY TEST

#### 5.1 Test Requirements

The stability of industrial trucks as specified in 1 shall be verified by means of one of the procedures given in 5.2.

#### 5.2 Verification Procedure

##### 5.2.1 Tilting Platform

5.2.1.1 A test platform shall be used which can be tilted about one side. A truck being tested for stability is placed on the initially horizontal test platform.

- a) For counterbalanced fork-lift trucks, the position of the truck on the test platform shall be in accordance with Test No. 1 of IS 4357 and the location of the truck on the test platform shall be in accordance with the requirements of IS 4357.
- b) For reach and straddle forklift trucks, pedestrian and rider-controlled, the position of the truck on the test platform shall be as for Test No. 1 of IS 7309 and the location of the truck on the test platform shall be in accordance with the requirements of IS 7309.
- c) For pallet stackers and high-lift platform trucks, pedestrian and rider-controlled, the position of the truck on the test platform shall be as for Test No. 1 of IS 7631 and the location of the truck on the test platform shall be in accordance with IS 7631.

5.2.1.2 The load shall be raised to its maximum elevation with the mast tilted forward to its fullest

extent. The platform shall then be tilted slowly to the specified slope as indicated in Test No. 1 of IS 4357, IS 7309 or IS 7631 as appropriate.

5.2.1.3 The truck is considered stable if it does not overturn under the conditions of the test.

5.2.1.4 For the purpose of this test, overturning is defined as the test platform slope value which if increased, would cause overturning of the truck.

##### 5.2.2 Fixed Slope

Fixed slopes with inclinations equivalent to the prescribed test slope shall be used. The slope surface shall be smooth and capable of supporting the truck mass without deformation likely to affect the test results.

- a) Counterbalanced forklift trucks under test shall be driven onto the fixed slope with mast lowered and the truck positioned in accordance with Test No. 1 of IS 4357. The location of the truck on the test slope shall be in accordance with the requirements of IS 4357.
- b) Reach and straddle forklift trucks, pedestrian or rider-controlled, shall be driven on the fixed slope with mast lowered and the truck positioned in accordance with Test No. 1 of IS 7309. The location of the truck on the test slope shall be in accordance with the requirements of IS 7309.
- c) Pallet stackers and high-lift platform trucks, pedestrian and rider-controlled, shall be driven on the fixed slope with the mast lowered and the truck positioned in accordance with Test No. 1 of IS 7631. The location of the truck on the test slope shall be in accordance with the requirements of IS 7631.

5.2.2.1 The mast shall be tilted forward to its fullest extent and the load elevated slowly and smoothly to its maximum elevation. The truck is considered stable if it does not overturn under the conditions of the test.

5.2.2.2 For the purpose of this test, overturning is defined as that mast height which, if increased, would cause overturning of the truck.

##### 5.2.3 Calculation

Compliance with the specified values may be determined by calculation. Such calculated capacities shall allow for manufacturing tolerances, deflections of mast, tyres, etc.

### 5.3 Test Load

5.3.1 The test load shall have a mass equivalent to the maximum load,  $Q$ , which the truck can elevate to its maximum lift height for the special conditions of this additional test, acting through the centre of gravity,  $G$ , nominally positioned at the standard load centre

distance,  $D$ , as indicated on the information plate of the truck, both horizontally from the front face of the fork arm shank and vertically from the upper face of the fork arm blade (see Fig. 2). The centre of gravity,  $G$ , of the test load shall be located in the longitudinal centre plane of the truck (see Table 1).

**Table 1 Test Load Conditions**  
(Clause 5.3.1)

Sl No.	Rated Load, $Q$ kg	Side, $2D$ mm
(1)	(2)	(3)
i)	Up to 999	800
ii)	1 000 to 4 999	1 000
iii)	5 000 to 10 000	1 200

#### 5.4 Safety Precautions

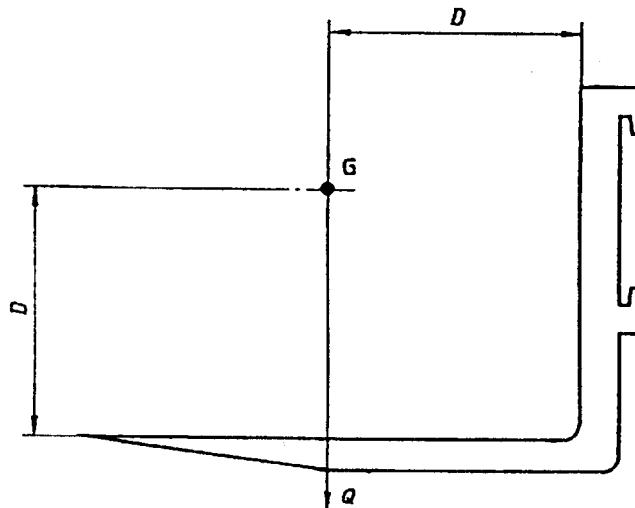
Safety precautions shall be taken in accordance with IS 4357, IS 7309 and IS 7631.

#### 6 STABILITY TESTS FOR TRUCK ATTACHMENTS OTHER THAN FORK ARMS

Trucks fitted with attachments other than fork arms shall be subjected to the same stability tests, except in cases where the attachment can bring the centre of gravity of the load out of the longitudinal centre plane of the truck. The test load shall be the specified load, at the specified load centre distance indicated for the attachment when used on the truck being tested.

#### 7 MARKING

The special capacity, as determined by this additional stability test, and the angle of forward tilt shall be indicated on the plate as specified in 3.4 of IS 6305 (Part 2).



**FIG. 2 TEST LOAD**

**ANNEX A**  
**(Foreword)**  
**COMMITTEE COMPOSITION**

Industrial Trucks Sectional Committee, TED 23

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### Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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